REMARKS

The Applicants and the undersigned thank Examiner Ghulamali for his careful review of this application. Claims 1-32 have been rejected by the Examiner. Upon entry of this amendment, Claims 2, 11, and 29 have been cancelled and Claims 1, 3-10, 12-28, and 30-35 remain pending in this application. The independent claims are Claims 1, 10, 20 and 26.

Consideration of the present application is respectfully requested in light of the above claim amendments to the application and in view of the following remarks.

Claim Rejections Under 35 U.S.C. § 112, Second Paragraph

The Examiner rejected Claims 5, 6, 9, 11, 15, 25, and 26 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicants regard as the invention. The Applicants offer remarks to traverse these rejections.

The Examiner identified several elements in the aforementioned claims that lacked proper antecedent basis. The Applicants appreciate the Examiner's helpful comments. The Applicants have amended these claims in accordance with the Examiner's helpful comments. Reconsideration and withdrawal of these rejections are respectfully requested.

Claim Rejections Under 35 U.S.C. §§ 102 and 103

The Examiner also rejected Claims 1, 7, 8, 9, 10, 16, 17-19, 26, 27, and 29-32, under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Application Publication No. 2003/0067990 filed in the name of Paul Bryant (hereinafter, the "Bryant reference"). The Examiner also rejected Claims 20, 22, and 25 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,962,011 issued in the name of Nobakht et al. (hereinafter, the "Nobakht reference").

The Examiner also rejected Claims 2, 5, 11, 14, and 28 under 35 U.S.C. 103(a) as being unpatentable over Bryant reference in view of Nobakht reference. The Examiner also rejected Claims 4, 6, 13, and 15 under U.S.C. 103(a) as being unpatentable over the Bryant and Nobakht references, and further in view of U.S. Patent No. 3,599,122 issued in the name of Erlenbach (hereinafter the "Erlenbach reference").

The Examiner rejected Claim 23 under 35 U.S.C. 103(a) as being unpatentable over Nobakht reference in view of the Erlenbach reference. The Examiner also rejected Claim 24

under 35 U.S.C. 103(a) as being unpatentable over the Nobakht reference in view of the Bryant reference.

The Examiner also rejected Claims 3 and 12 under 35 U.S.C. 103(a) as being unpatentable over the Bryant reference in view of the Erlenbach reference, and further in view of a printed publication authored by Weger et al. ("Gilbert Multiplier as an active mixer with conversion gain bandwidth of up to 17 GHz", Electronics Letters, 28 March 1991, Vol. 27, 7th Issue, hereinafter, the "Weger reference"). The Examiner rejected Claim 21, under 35 U.S.C. 103(a) as being unpatentable over the Nobakht reference in view of the Weger reference.

The Applicants respectfully offer remarks to traverse these pending rejections. The Applicants will address each independent claim separately as the Applicants believe that each independent claim is separately patentable over the prior art of record.

Independent Claim 1

The rejection of Claim 1 is respectfully traversed. It is respectfully submitted that the Bryant, Nobakht, Erlenbach, and Weger references, individually or in view of each other, fail to describe, teach, or suggest the combination of: (1) a signal conditioning filter comprising (2) a first stage for mitigating degradations of a digital signal that occur according to a first time scale, the first stage comprising (3) a linear tapped-delay line filter tuned to the first time scale, (4) the first time scale comprising a fraction of the period at which the symbols are propagated, and (5) a second stage for removing signal distortions that occur according to a second time scale, the second stage comprising (6) a linear tapped-delay line filter tuned to the second time scale, (7) the second time scale being different than the first time scale and comprising (8) a magnitude at least equal to the period at which the symbols are propagated; and (9) a signal integrity unit for controlling the signal conditioning filter by maximizing fidelity of the digital signals, as recited in amended independent Claim 1.

The Bryant Reference

The Bryant reference describes a digital communication system that includes a multistage equalizer 137 and an equalizer controller 157. The multistage equalizer 137 has a first linear stage 140 that can remove the effects of linear dispersion of a digital signal. The second non-linear stage 145 of the multistage equalizer 147 can reverse compression and can help reduce the effects of other distortions. See Fig. 1 of the Bryant reference reproduced below and discussed in column 3, paragraph [0026].

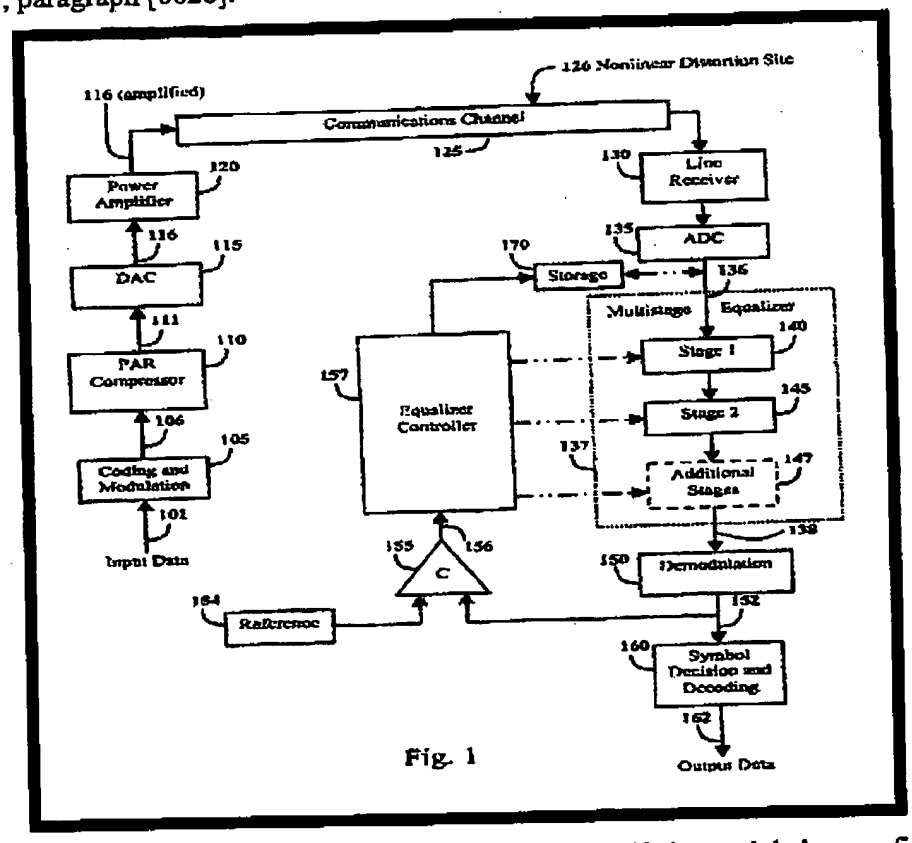


Fig. 1

The Bryant reference states that the linear stage 140 is modeled as a finite-impulse response (FIR) filter. See the Bryant reference in paragraph [0035]. The Bryant reference states that the non-linear stage 145 of the multistage equalizer 137 can be characterized by three decompression functions. See the Bryant reference in paragraph [0037]. One of ordinary skill in the art recognizes that the Bryant reference uses the non-linear stage 145 to address nonlinear compression that is introduced by the transmitter and channel 125. See also Bryant reference, paragraph [0026].

Opposite to the linear stage 140 and non-linear stage 145 of the Bryant reference, the invention described by amended independent Claim 1 provides two stages comprising linear tapped-delay line filters tuned to different time scales to mitigate degradations of the digital signal that occur according to a first time scale and to remove signal distortions that occur according to a second time scale. The Bryant reference does not provide any teaching of two linear tapped-delay line filters that are tuned to two different time scales, the first time scale comprising a fraction of the period at which the symbols are propagated and the second time scale comprising a magnitude at least equal to the period at which the symbols are propagated, as recited in amended independent Claim 1 in combination with the other claim elements.

The Nobakht Reference

The Examiner refers the Applicants to the background section of the Nobakht reference which describes a feed forward filter (FFF) of the prior art. This FFF of the prior art has input that is a received symbol sequence and that is sent through a series of delay elements (T). The received input sequence in each of the delayed input sequences are provided to their own variable gain amplifiers. See Fig. 1a of the Nobakht reference illustrated below.

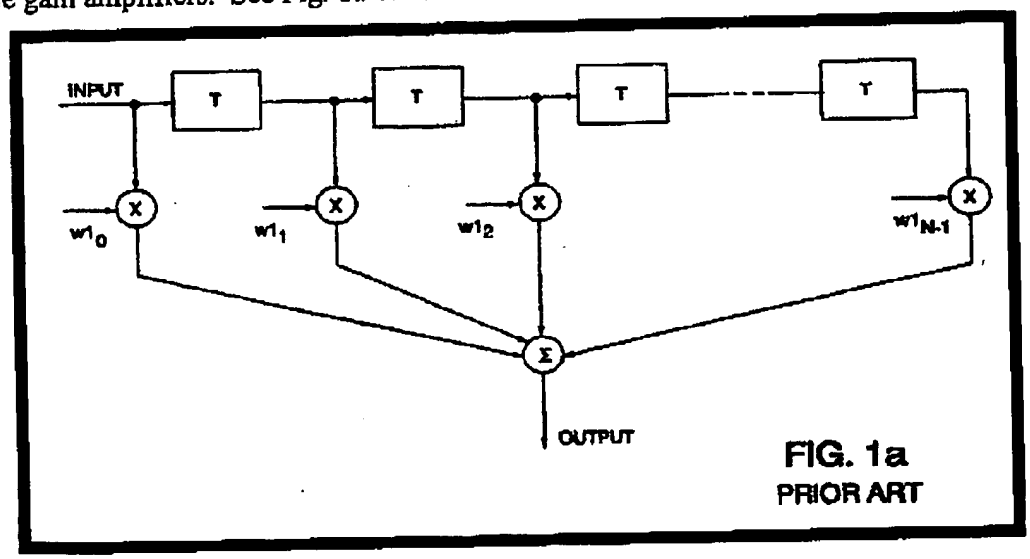


FIG. 1a
PRIOR ART

The variable tap gains are usually referred to as adjustable coefficients. The received input sequence in each of the delayed input sequences are multiplied by their respective adjustable coefficients. See the Nobakht reference in column 7, lines 52-68.

The FFF of the Nobakht reference does not provide two stages comprising linear tapped-delay line filters tuned to different time scales to mitigate degradations of the digital signal that occur according to a first time scale and to remove signal distortions that occur according to a second time scale. The Nobakht reference does not provide any teaching of two linear tapped-delay line filters that are tuned to two different time scales, the first time scale comprising a fraction of the period at which the symbols are propagated and the second time scale comprising a magnitude at least equal to the period at which the symbols are propagated, as recited in amended independent Claim 1 in combination with the other claim elements.

The Erlenbach Reference

The Examiner admits that the Bryant and Nobakht references do not provide any teaching of tapped-delay lines comprising an LC circuit. To make up for this deficiency of these two references, the Examiner relies upon the Erlenbach reference (referred to by the Examiner as the Leuthold reference).

The Examiner relies upon the Erlenbach reference in order to provide a teaching of a tap delayed line comprising an LC circuit. The Erlenbach reference describes a delay line 13 illustrated in Figure 7 that is made without the use of electromagnetic materials.

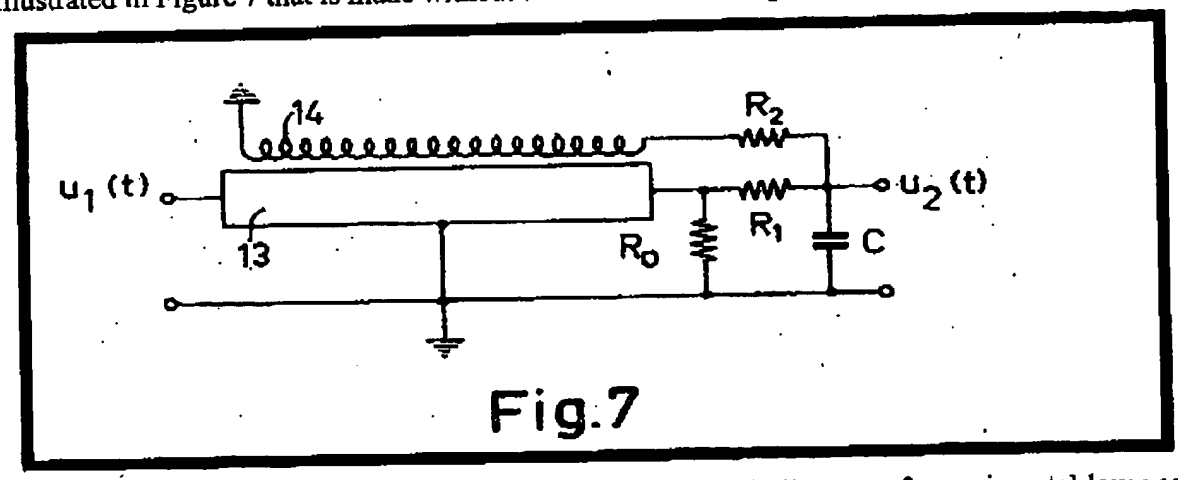


Fig.7

Figure 7 of the Erlenbach reference illustrates a circuit diagram of experimental low pass filter that has both capacitive (c) and inductive components (14). The Erlenbach reference does not teach or suggest two linear tapped-delay line filters that are tuned to two different time scales, the first time scale comprising a fraction of the period at which the symbols are propagated and the second time scale comprising a magnitude at least equal to the period at

which the symbols are propagated, as recited in amended independent Claim 1 in combination with the other claim elements.

The Weger Reference

The Examiner admits that the combination of the Bryant and Nobakht references does not provide any teaching of coefficient amplifier comprising a Gilbert cell multiplier. The Examiner relies upon the Weger reference for a generic teaching of a Gilbert cell multiplier. The Weger reference describes a Gilbert cell multiplier for ultra band applications that is made with silicon bipolar technology. One of the multiplier's features is that it is self aligning. See Abstract, Weger reference.

The Weger reference does not provide any teaching of two linear tapped-delay line filters that are tuned to two different time scales, the first time scale comprising a fraction of the period at which the symbols are propagated and the second time scale comprising a magnitude at least equal to the period at which the symbols are propagated, as recited in amended independent Claim 1 in combination with the other claim elements.

Conclusion Regarding Independent Claim 1

In light of the differences between Claim 1 and the Bryant, Nobakht, Erlenbach, and Weger references mentioned above, one of ordinary skill in the art recognizes that the combination proposed by the Examiner cannot anticipate or render obvious the recitations as set forth in amended independent Claim 1. Accordingly, reconsideration and withdrawal of this rejection of Claim 1 are respectfully requested.

Independent Claim 10

The rejection of Claim 10 is respectfully traversed. It is respectfully submitted that the Bryant, Nobakht, Erlenbach, and Weger references, individually or in view of each other, fail to describe, teach, or suggest the combination of: (1) a first filter stage comprising (2) a first linear tapped-delay line filter tuned to a first time constant, (3) the first time constant comprising a value that is less than a symbol period, (4) for compensating for signal distortions that occur within a single symbol period and (5) for integrating over less than a symbol period in order to substantially reduce at least one of ringing, jitter, and noise; and (6) a second filter stage

comprising (7) a second linear tapped-delay line filter tuned to a second time constant, (8) the first time constant being smaller than the second time constant and (9) the second time constant comprising value at least equal to a symbol period, the second filter stage for removing inter-symbol interference (ISI), as recited in amended independent Claim 10.

Similar to the analysis of independent Claim 1, the Examiner's proposed combination of references fails to address a combination of elements comprising: two stages comprising linear tapped-delay line filters tuned to different time constants in which the first time constant comprises a value that is less than a symbol period and the second time constant comprises a value at least equal to a symbol period, as recited in amended independent Claim 10.

In light of the differences between Claim 10 and the Bryant, Nobakht, Erlenbach, and Weger references mentioned above, one of ordinary skill in the art recognizes that the combination proposed by the Examiner cannot anticipate or render obvious the recitations as set forth in amended independent Claim 10. Accordingly, reconsideration and withdrawal of this rejection of Claim 10 are respectfully requested.

Independent Claim 20

The rejection of Claim 20 is respectfully traversed. It is respectfully submitted that the Bryant, Nobakht, Erlenbach, and Weger references, individually or in view of each other, fail to describe, teach, or suggest the combination of: (1) a cascade of two linear filters, where each filter comprises (2) a series of variable gain amplifiers (3) connected by delay elements, (4) each delay element for a respective filter having a same delay value, (5) each linear filter equalizing a particular frequency band of a multilevel signal; (6) the delay elements in the first filter being tuned to a fraction of the symbol period at which the symbols are propagated for compensating for signal distortions that occur within a single symbol period and (7) for integrating over less than a symbol period in order to substantially reduce at least one of ringing, jitter, and noise; (8) the delay elements in the second filter being tuned to a magnitude at least equal to the symbol period at which symbols are propagated for mitigating degradations that occur according to the period, as recited in amended independent Claim 20.

Similar to the analysis of independent Claim 1, the Examiner's proposed combination of references fails to address a combination of elements comprising: a cascade of two linear filters, where each filter comprises a series of variable gain amplifiers connected by delay elements,

each delay element for a respective filter having a same delay value, the delay elements in the first filter being tuned to a fraction of the symbol period and the delay elements in the second filter being tuned to a magnitude at least equal to the symbol period at which symbols are propagated, as recited in amended independent Claim 20.

In light of the differences between Claim 20 and the Bryant, Nobakht, Erlenbach, and Weger references mentioned above, one of ordinary skill in the art recognizes that the combination proposed by the Examiner cannot anticipate or render obvious the recitations as set forth in amended independent Claim 20. Accordingly, reconsideration and withdrawal of this rejection of Claim 20 are respectfully requested.

Independent Claim 26

The rejection of Claim 26 is respectfully traversed. It is respectfully submitted that the Bryant, Nobakht, Erlenbach, and Weger references, individually or in view of each other, fail to describe, teach, or suggest the combination of: (1) receiving a communications signal; (2) applying an adjustable linear conditioning filter that compensates for signal distortions; (3) determining a quality of the communications signal after the conditioning filter by using a low pass filter (4) followed by an analog-to-digital converter to digitize output of the low pass filter and (5) estimating the quality of the digital output from the analog-to-digital converter with a microcontroller; (6) in response to determining the quality of the received communications signal, adjusting one or more parameters of the conditioning filter with the microcontroller to improve the quality of the communications signal, as recited in amended independent Claim 26.

The Examiner's proposed combination of references fails to address a combination of elements comprising determining a quality of the communications signal after the conditioning filter by using a low pass filter followed by an analog-to-digital converter to digitize output of the low pass filter and estimating the quality of the digital output from the analog-to-digital converter with a microcontroller, as recited in amended independent Claim 26.

In light of the differences between Claim 26 and the Bryant, Nobakht, Erlenbach, and Weger references mentioned above, one of ordinary skill in the art recognizes that the combination proposed by the Examiner cannot anticipate or render obvious the recitations as set forth in amended independent Claim 26. Accordingly, reconsideration and withdrawal of this rejection of Claim 26 are respectfully requested.

Dependent Claims 3-9, 12-19, 21-25, 27-28, and 30-35

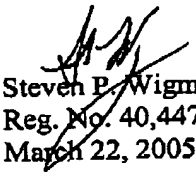
The Applicant respectfully submits that the above-identified dependent claims are allowable because the independent claims from which they depend are patentable over the cited references. The Applicant also respectfully submits that the recitations of these dependent claims are of patentable significance. In view of the foregoing, the Applicant respectfully requests that the Examiner withdraw the pending rejections of dependent Claims 3-9, 12-19, 21-25, 27-28, and 30-35.

CONCLUSION

The foregoing is submitted as a full and complete response to the Office Action mailed on September 22, 2004. The Applicants and the undersigned thank Examiner Ghulamali for consideration of these remarks. The Applicants have amended the claims and has submitted remarks to traverse rejections of Claims 1-32. The Applicants respectfully submit that the present application is in condition for allowance. Such action is hereby courteously solicited.

If the Examiner believes that there are any issues that can be resolved by a telephone conference, or that there are any formalities that can be corrected by an Examiner's amendment, he is invited to contact the undersigned in the Atlanta Metropolitan area (404) 572-2884.

Respectfully submitted,



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